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THE SUPERIORITY

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THE SUPERIORITY OF THE ELECTRIC LIGHT AS AN ILLUMINANT.

At first sight it may seem strange that the old and crude forms of artificial illumination have each in turn been superseded by methods which, in some cases, have been considered more expensive. Candles gave way to kerosene, kerosene to gas, and now gas is being steadily supplanted by the electric light. That this increase in popularity of the electric light is a natural sequence is easily accounted for by the fact that each succeeding form of artificial light has more nearly approached the light of day in its color and healthfulness. Passing over candles and kerosene we will endeavor to point out a few of the decided advantages of the incandescent electric light over gas.

No one would use today the system of plumbing in vogue ten years ago. Within a few years we shall look back on the faulty methods of lighting, more or less used today, as we do now on the disease breeding plumbing systems that once satisfied us. Physicians and sanitary engineers are vieing with each other in attempting to remove from the home all conditions which encourage and develop fever, debility, nervous diseases and kindred ailments. The highest authorities of Europe and America are a unit in the opinion that the effects of an improper method of illumination are of so serious a character as to greatly menace the health of our homes. That gas is an unhealthy method of illumination is abundantly proved on the authority of those eminent doctors, professors and scientific men quoted at the end of this paper. A whole volume of instruction may be gathered by a glance at the subjoined table which is a comparison of the deleterious effects of five methods of illumination, arranged in the chronological order of their chief use; that is, commencing with the tallow candle and ending with the electric light.

COMPARISON OF DIFFERENT FORMS OF ILLUMINATION.

	Cu. Ft. of Oxygen Consumed.	Cu. Ft. of Air Consumed.	Cu. Ft. of Air Vitiated.	Cu. Ft. of Carbonic Acid Produced.	Heat Produced in 1 lb. Water Raised 1° Fahr.
12 C.P. Tallow Candle . .	12.00	60.00	993.00	8.73	505.5
12 C.P. of Paraffine Oil . .	6.81	34.05	484.05	4.50	361.9
12 C.P. of Kerosene . . .	4.45	22.30	376.30	3.54	232.6
12 C.P. of Gas	5.45	17.25	345.25	3.21	278.6
12 C.P. Incandescent Light .	None.	None.	None.	None.	13.8

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It will be noticed that each of these methods, with the exception of the incandescent electric light, consumes oxygen, the life giving portion of the air, and vitiates the air by the production of carbonic acid, a poisonous gas. In addition to this double deterioration a large quantity of heat is produced which only serves to add to the discomfort of impure air. There are other products of the combustion of a gas flame, particularly in the confined air space of an ordinary room, which, while not so injurious to health as those just mentioned, damage our houses, furniture and decorations; thus the carbon, sulphureted hydrogen, etc. thrown off blacken our ceilings, curtains and draperies, tarnish picture frames and metal work, and destroy the binding of books. The expense of redecoration, renovation and replacing these will be saved by the use of the electric light and will more than compensate for any apparent additional original cost of the light itself.

Over and above the advantages already mentioned, the electric light has in its favor the facility with which it can be installed to produce a better diffusion of light in our dwellings. The old idea of a group of lights in the center of the room has now become obsolete. The aim of all progressive architects is to so distribute the lights around the room that there will be no shadows cast.

This was well illustrated at the World's Fair where it will be remembered that the absence of electroliers in the pavilions and offices of the different electrical exhibitors was very marked; the rooms being well lighted without the source of light being uncomfortably apparent. While the artistic effect of this method of lighting may be the principal reason for its introduction, its utility is found in the ease and comfort with which reading and writing can be carried on in any part of a room, so lighted, without straining the eyes. We are informed by eminent oculists that one of the chief causes of the prevalence of defective eye sight is due to reading and studying in a poor artificial light. It therefore behooves all parents to see that the rooms where their children study, prepare their lessons or read for recreation, should be well lighted by as white a light as it is possible to obtain, and this is the incandescent electric light.

People have continued to use gas while the price of kerosene has been constantly declining because of the superiority and greater convenience of gas; and for the same reason they will continue the use of the incandescent light notwithstanding any reduction experimenters may accomplish in the cost of producing gas. The possible uses of gas produced at a low cost may cover a broad field in cooking and heating but as an illuminating agent its use is limited; and in the same manner as it took the place of candles, kerosene and other crude forms of light, it is now being steadily displaced by the incandescent electric light for hygienic reasons and on account of its greater flexibility, lessened fire risk and its many other excellencies.

The recent introduction of the Auer-Welsbach gas light has brought this subject forward to greater prominence than ever before. Its excessive brilliancy when new and the many claims for it put forward by its friends are very attractive but when subjected to the scrutiny of scientists it is found to be more detrimental than the common gas burner. The Auer-Welsbach gas lamp does not depend upon the flame itself for illumination but upon the heating of a mantle or hood which is suspended in the flame. From a hygienic point of view this Auer-Welsbach gas lamp is a retrogression instead of an improvement. We have already spoken about the carbonic acid gas given off by the ordinary gas flame. In the Welsbach burner this is converted into carbon monoxide gas which is one of the most deadly gases known. Passing to the expense we find that the parts requiring renewal are the glass chimney and mantle or hood. These are retailed at 50 cents. each. Owing to the intense heat the chimneys frequently break and in doing so often destroy the mantle as well, thus entailing a cost of $1 for renewal. In most places three or four 16 c.p. incandescent electric lamps can be bought for this sum. The Munich Gas Light Company who have given these Welsbach burners quite a test in every day use, state that the average life for a mantle is only one hundred and eighty (180) hours and that the cost of maintenance is more expensive than 32 c.p. lamps.

The following translation from a continental journal is an epitome of the whole subject.

"At the sitting of the Municipal Council at Vienna, on the 9th of August last, M. de Goetz, councilor, read a report of the Service of Constructions, on the question of introducing the Auer incandescent burners in the city schools."

The report stated that the Auer burners manifested a constant diminution in candle power which could not be arrested even by the frequent substitution of new mantles; that besides the glare and color of the light attacked the retina of the eye, especially at the commencement, also that the frequent breakage of glass chimneys was capable of becoming a danger to persons.

"Conformably with this report, it was decided that the referendum to decline to permit the introduction of the Auer burner into the schools.

"The Council adopted the report and adhered to its conclusions.

"If one considers," so comments the paper, "that Vienna is the birthplace (berceau) of the Auer burner, it is impossible not to be impressed with the decision of the Municipal Council of Vienna. At the moment when myopia and weakness of sight continue more and more to develop, no precautions are excessive on the subject of lighting of schools and colleges."

The following quotations are from authorities whose opinion carry weight. They go to prove the dangers to the general health of the community from the use of obsolete and defective methods of illumination and should be carefully read by every housekeeper and particularly every mother.

W. H. PREECE, F. R. S., President of the British Association.

Electric lighting has become popular, not alone from the beauty of the light itself, but from its great hygienic qualities in maintaining the purity and coolness of the air we breathe. The electric light need not be more brilliant than gas, but it must be more healthy. It need not be cooler than a wax candle, but it must be brighter, steadier and more pleasant to the eye. In fact, it can be rendered the most perfect artificial illumination at our disposal, for it can illumine a room without being seen directly by the eye; it can be made absolutely steady and uniform without irritating the retina; it does not poison the air by carbonic acid and carbonic oxide, or dirty the decorations by depositing unconsumed carbon; it does not destroy books or articles of virtu and art by forming water, which absorbs sulphur acids; and it does not unnecessarily heat the room. In our Central Savings Bank in London, it has been found, after two years' experience of electric lighting, that the average amount of absence from illness has been diminished by about two days a year for each person on the staff. This is equivalent to a gain to the time of about eight clerks in that department alone.

JAMES L. GREENLEAF, C. E.

All persons readily admit as a truism that they cannot live without air, but, unfortunately, they seldom get much beyond the bare admission. I wish to impress upon the reader the very great importance of pure air to the human body. Air which has passed through the lungs is unfit to be respired again. An adult, in ordinary conditions of quiet occupation, emits about .6 of a cubic foot per hour of carbonic acid gas. A four-foot gas burner emits 3.38 cubic feet of this gas in the same time. So, as producers of carbonic acid gas, an ordinary gas burner can hold its own against nearly six men.

When we are told that, to keep the standard of purity at six parts of carbonic acid gas to 10,000, the supply must be 4,000 cubic feet per hour, this means that if a man is put in a closed room 20 x 20 and 10 feet high, filled with fresh air, at the end of one hour the air will have reached the limit of impurity, and after that it will become unhealthy. Similarly with gas jets. (See proportionate discharge of carbonic acid above stated.) All do not realize what consumers of air our lamps and gas lights are. From one point of view they are necessary nuisances. Of course, where gas is used for illumination, some means of specially ventilating the rooms should be used, or else they will become unhealthy during the evening, but even if this is not done, the point is that these lights are a special source of vitiation entirely independent of the number of the inmates of the room.

Hon. DOUGLAS DALTON, F. R. S., in "Healthy Dwellings."

The impurity of the air caused by artificial light is a very serious matter. Lamps, candles and gas lights each consume the oxygen and produce carbonic acid gas. One cubic foot of gas will destroy the entire oxygen of about eight cubic feet of air, vitiating per hour upon an average as much air as would be rendered impure by the respiration of one person. It is most important to the purity of the air of a room that the product of combustion of gas should not mingle with the air. Several forms of gas light have been designed for this purpose, but as a rule, they do not entirely fulfil their object, for in many cases they conflict with the other arrangements for ventilation. The only safe plan is to place the gas burner in a globe entirely cut off from the room supplied with fresh air directly from the open air, the fumes being also carried directly into the open air. Such an arrangement is very simple in the case of an outside wall, and it is the only system which will keep the air in a room free from the fumes of the gas.

From "HEALTH MAGAZINE," London, Eng.

Electric Lighting, as a means of preserving and promoting health, has not been sufficiently appreciated by the British public. It may be safely said that electric light is the only form of artificial illumination which is not injurious to health. This is a strong argument in favor of the general introduction of the electric light; but it is when we begin to compare this light with that of gas, or any other artificial lights, that its beauty, purity, brightness, cleanliness and safety comes out in strongest contrast.

Gas not only consumes and pollutes the air, but it is very poisonous, besides having a deleterious effect on the furniture and decorations of our homes. Gas gives off a certain amount of soot, which is evident from the blackened ceilings and cornices, discolored paper, etc. The destruction of goods in the shops of our great cities from the action of gas must also be very great. In offices, shops and factories, employes can use it continuously without feeling the lassitude, headache and fatigue which are frequently caused by the use of gas. As a means of retaining health, the advantages of the electric light are indisputable.

The electric light is a pure, healthy light, which, if no other were used, and the smoke of our fires self-consuming, would leave our cities almost as fresh and bracing as a highland hill, and rosy instead of pale cheeks, and brightly flashing instead of dim lusterless eyes would mark the city inhabitants.

Prof. D. G. WILLIS, F. R. S.

Prof. Willis has lately written a criticism on the thoughtlessness in our people in caring for the health of their households. He believes that we are either especially ignorant or especially criminal in the matter of the impure air we allow to remain in our homes. He lays especial stress on providing proper and systematic ventilation for all living rooms. Grates (though better than nothing) do not remove from the room the carbonic acid gas which we breathe out, and which a gas flame generates in even larger quantities.

To those of us who have houses not supplied with central draft ventilation he strongly advises the disuse of oil lamps and gas for lighting, the idea being to reduce the quantity of carbonic acid gas to the lowest possible limit by eliminating one source of supply, as constantly breathing air having more than 4 per cent. of this gas will leave the system in a receptive condition for typhus, scarlet fever and in fact most infectious diseases.

UNITED STATES CONSULAR REPORT, 1891, p. 258. Water Gas.

The laws of Russia forbid the manufacture and use of this gas, on the ground the gas is injurious to health. There is a special article in the patent laws of the country to the effect that no mechanical device or any chemical combination producing articles injurious to the health of the people are patentable. Many parties have made repeated efforts to introduce water gas in Russia, but all such applications have been rejected, invariably meeting with the unanimous opposition of the Imperial Society for the Preservation of Health. J. M. CRAWFORD,
Consul-General.

EFFECTS OF LIGHT AIR.

The air in high altitudes is rare and contains less oxygen than at a sea level. It therefore is more important, in such situations, that sanitary devices looking to a maintenance of a sufficient supply of oxygen should be adopted. A gas burner in one hour uses four times as much oxygen as one person requires in the same time. As we have less oxygen in a cubic foot of air it behooves us to see that we use as little of our supply of the life-giving oxygen as possible. In addition, the gas jet emits enough carbonic acid gas to vitiate a very large proportion of the air. For this reason, where gas is used for illumination, care should be taken that all of the carbonic acid gas generated be carried out of the room directly from the flame, and a sufficient supply of fresh air be added to the room, preventing the percentage of oxygen descending to the danger point. English authorities recommend a gas burner having a direct connection with the outside air for its supply of oxygen, and another pipe running to the outside for carrying out of the room the dangerous carbonic acid gas. This would increase the cost of lighting by gas to more than that of the electric light, but where the health of our homes is concerned it is of small moment.

We have admitted in our households, in gas, one of the most poisonous agencies that I can well think of. It is there to be turned on at an instant by careless children and servants. We are being poisoned by it all the time. Let one of you try to make a perfectly tight joint, and you will find that it becomes a high art. You cannot prevent the leakage of gas. It will take place imperceptibly. We feel overcome by a lassitude, and we do not know why—Malaria! Nine times out of ten it is the gas. There is in gas of all kinds the most improved forms of gas, carbonic oxide, which is highly poisonous, and if taken into our systems the effects will gradually undermine our constitutions. This is one of the indirect disadvantages of gas. The supplanting of that by electric light will be of great advantage.

From the "HEALTH JOURNAL."

The careful study of hygiene is the most important and at the same time the most neglected part of our children's education. Care of the body and care of the mind can only be accomplished through a thorough knowledge of physiology and of the physical condition necessary to good health. To live healthily the muscles of the brain should be exercised regularly and under proper supervision. Nothing can be accomplished, however, if the lungs are left out of consideration. Breathe full and deep, and breathe pure air, air with its quota of oxygen. No one should remain in any room that contains air that has been burned up, as the scientific put it. This simply means air that has a large percentage of the gas thrown off by burning wood, coal or illuminating gas—the scientific name is carbonic acid gas. When present in large quantities it can be detected, but the danger mark is then passed. Every precaution should be taken to guard against the superfluous introduction of this dangerous factor into living rooms, long before that point is reached. There is no question that sensible and moderate exercise and a pure air supply for the lungs would materially increase our longevity.

From the Rochester "MORNING HERALD."

Gas is valuable for illuminating purposes, and will remain in use for an indefinite period of time, no doubt; but when the incandescent electric light can be secured upon nearly equal terms, it is in several respects incomparably superior to gas or any other illuminating agent. The advantage of the incandescent lamp over gas is generally apparent in that the former does not vitiate the air of an apartment. The carbonized filament that is raised to incandescence and furnishes the light is enclosed in an airtight glass bulb, and therefore, though a hundred of them be burning in a closed room, no oxygen is taken from the apartment, and the air of the room remains as pure as if no lamps were burning. It is estimated, we believe, that a single gas jet, speaking generally, consumes more oxygen than a human being. The difference in the purity of the atmosphere of a room, the windows and the doors of which are kept closed, as in cold weather, is therefore almost immeasurably in favor of the incandescent light. Where there are several occupants of such a room, as in the various apartments of the public buildings, their health, as well as the cost of the several systems of lighting respectively, should be considered.

"ECONOMIC VALUE OF ELECTRIC LIGHT." A. R. Foote.

While those bound to the old civilization by invested interests are endeavoring to stay the progress of events by plying people's fears with "bugaboo" stories about the "deadly wires," the unprogressive government of Spain has been struck with lightning, and has decreed as a measure of public health and safety (under penalty of not being allowed to open their doors, if the order is not complied with), that every theatre in the kingdom must be illuminated by electricity.

From "CENTRAL MEDICAL JOURNAL."

The general prevalence of the grip and its accompanying ailments in the past three years has called the attention of physicians to the conditions existing in their patients' dwellings. They have already forced the adoption of plumbing regulations in our great cities, and are now fixing for a crusade against gas for lighting purposes. The fact is cited that in theatres and large audience rooms the carbonic acid gas emanating from the gas burners has such deleterious effects upon the audience that managers were forced to adopt electricity. In the dwelling house the presence of this gas is all the more dangerous, because its presence cannot be detected as readily. It does its work slowly, but none the less surely; with each breath taken it keeps out of the lungs the oxygen-bearing air that should be in its place. Physicians have started the crusade, and their war cry is "pure air for the home." Let them bring on their facts, and the people will stand by them if they can prove their case.

Dr. J. S. LEONHARDT, of Lincoln, Neb. From the "Annals of Hygiene."

I am satisfied that the consumers of coal gas, whether for lighting, heating or other purposes, do not appreciate the danger attending its use. In support of this assertion, let the following case, with a few comments, testify:

Mr. A. B. C., aged 50 years, weight about 123 pounds, light hair, blue eyes, of slight statue, with full complement of symptoms of cerebral and spinal neurasthenia. He had been a sufferer for years from mental and physical debility, and about a year ago found it necessary to relinquish his occupation, that of manager of a large wholesale establishment doing an extensive business. All that I could do for him only kept him about "customary par," with now and then a brief paroxysm of improvement. His family history showed no constitutional or other hereditary disease; his immediate and remote ancestors were robust and long-lived. His personal history offered nothing in explanation of his intractable condition. I concluded to carry the investigation even into his home life. Upon entering his residence an overwhelming ordor of coal gas met me in the vestibule. He expressed some surprise at my behavior, said he did not notice it, etc. An examination of the different parts in this abode revealed the following state of affairs: The rooms were on the ground floor and consisted of hall, sitting room, two bed chambers, dining room, kitchen and bath; they contained eleven three-foot gas jets, a gas parlor heater, a gas range in the kitchen. The daily consumption of gas averaged 100 feet. There was no special arrangement for ventilation. The cubic contents of the entire floor equalled nearly 7,600 feet, half of which was represented by the parlor and sitting room. It occurred to me that I had found the laboratory in which the conditions were elaborated responsible for the unhappy condition of my patient, and so I informed him. In accordance with my suggestions coal is now used in the kitchen, the parlor heater reposes in the woodshed, and incandescent lights have taken the place of gas jets. My patient is on the highway to recovery, and his progress is so rapid that it is noticeable day by day. The other importance of the subject will not justify me in dismissing it at this point.

Illuminating or coal gas is a heterogeneous mixture of gases, etc., resulting from the destructive distillation of soft coal, wood, oils, etc. The commercial product contains upward of fifty different ingredients, depending largely upon the material and the amount of heat used in its manufacture. The gases that concern us in the present article are carbon monoxide, and, its resultant when burned, carbon dioxide. Carbon monoxide is present in coal gas to the extent of 12 to 16 per cent.; the remainder is largely hydrogen free and in its carburetted form. Carbon monoxide is a most diffusible and deadly narcotic poison; the dioxide is not so toxic, but concerns us also because its proportion in the air has been adopted as the measure of its impurity. Carbon monoxide is without odor and is lighter than air; it is so diffusible that it will pass through the plates of a furnace when they are red hot. The objectionable features of all furnaces and open grates are, therefore, very evident, not only generating the noxious gas, but giving it easy access to rooms. The danger from this source is much increased by defective flues, which are altogether too common, but the most prolific source is without doubt coal gas. Carbon monoxide combining with the haemoglobin of the blood expels its oxygen. So fatal is it to all forms of animal life that an atmosphere charged with 1 per cent. of it will kill a dog in less than two minutes; half that degree of contamination will destroy birds in a few minutes; plants wither and die quickly in such an atmosphere. While it is a slow acting poison, it is nevertheless a very certain one. Inhaled in small quantities for a long time it produces only a feeling of weakness, loss of appetite, a dull headache, a dry cough, and other symptoms that simulate those of malaria very closely. Taken in large quantities it causes headache of an intense neuralgic kind, mental confusion, extreme exhaustion, and a severe form of bronchial irritation. Taken in toxic doses it kills almost instantly by causing spasm of the glottis, convulsions, coma.

Carbon dioxide is also an inodorous gas. It is heavier than air, less diffusive than its congener, it is irrespirable, possesses poisonous qualities that are not simply the result of its having excluded oxygen. It is produced by the burning of carbon in the air, by respiration, in fact, by all forms of oxidation, whether rapid or slow, in the animal or vegetable kingdoms. We are concerned here with its presence in our dwellings as a product of combustion and respiration. An adult male in repose exhales about .7 cubic foot of carbonic dioxide per hour. This varies somewhat with age, being greater between the ages of 25 and 32. An adult exhales in the same time .6 cubic foot, and a child about .4 cubic foot. From this we might estimate that a mixed crowd would average .6 cubic foot per hour per head. Occupance by one person of a room containing 3,500 feet would raise the proportion of carbonic dioxide from four parts to six parts in 10,000 every hour, the latter amount being regarded as a contamination, while the former is about what exists in the outside air constantly. A common sixteen or twenty candle power kerosene lamp produces about as much carbonic dioxide as an adult man; a common three-foot burner, consuming coal gas, produces as much as three men, while the same sized burner, using water gas, produces nearly as much as four men. I think it will not be necessary to make any application of these synoptical facts and figures. The literature on the subject is voluminous and scientific, and the ablest scholars on both sides of the Atlantic have not considered a careful treating of this great and beautiful field in sanitary science beneath their dignity.

Dr. HENRY SEWALL, Secretary State Board of Health, Colorado.

The combustion of the product of a common gas jet depends upon the amount of oxygen in the atmosphere of a room. The more oxygen there is the greater will be the combustion. Gas, therefore, burns brighter in a well aired room. As the air grows more foul the less the combustion is and the greater the quantity of the poisonous gases thrown out. A gas jet is said to consume as much pure air as two men. Coal differs in quality, and consequently the gas we burn differs tremendously and the poisons thrown off are many. Carbon monoxide is the most deadly in its effect. Monoxide has a greater affinity for the blood than oxygen, and forces it out of the corpuscles and causes asphyxiation. The poison made by respiration and burning gas is a depressing poison, and is not usually detected until the atmosphere becomes heavily laden. There are great objections to gas stoves which have no chimneys, as the sulphurous and other poisons all remain.

Dr. CHARLES DENNISON, Denver, Col.

When the oxygen is disposed of by a flame from a lamp or gas jet a number of poisonous gases take its place in the atmosphere. The effect of these poisons on the lungs is suffocation. One can be drowned by poisonous air as well as by water. Electric lights do not vitiate the air, while gas consumes the oxygen. This can, however, be overcome in its evil effects by proper ventilation.

Dr. J. SOL. SMITH, Denver, Col.

Carbon monoxide and dioxide, the latter being the result of the former when burned, are deadly poisons. They are present in large quantities in illuminating and heating gas, and it is impossible to arrange their fixtures so as to prevent their diffusion. The monoxide is more deadly than the dioxide. It is lighter than air and without odor, and it will pass through red hot iron. An important point for Denver is that while coal gas contains from 5 to 9 per cent. of carbon monoxide, there is from 12 to 16 per cent. in water gas. These toxic gases are particularly injurious and irritating to persons suffering from bronchial or pulmonary troubles. I say, without hesitation, that electricity is the best medium for illuminating purposes. A common three-foot gas burner produces as much dioxide as three men breathing, and if water gas is consumed, nearly as much as four men. Then in this altitude it must be remembered that, owing to the light air, the consumption of oxygen is greater than in a lower level, where the greater humidity furnishes more oxygen. I have been studying the remarks of medical men in professional journals, and I must agree with them that anyone who allows gas to be burned in his house should be held responsible for the lives of those who rely on his judgment for protection.

Major B. L. HUNTINGTON, Chief of the Medical Department U. S. A., Dept. of Colorado.

There is no denying the fact that the burning of gas in a room is injurious to health. The oxygen of the air is steadily consumed by the flame and unless oxygen is supplied from without, as fast as the consumption takes place, the air becomes vitiated. Experience also shows that gas is liable to escape from the burners and assist in poisoning the air. The electric light gives out comparatively little heat and is absolutely free from objections which are argued against the gas jet.

Dr. KERR, California Block, Denver, Col.

A man will get used to anything, no matter how dangerous it is. There's not one in ten even gives a thought to his gas burners, and yet they are liable to cause most serious trouble to his family's health, and may even threaten life. Any open flame is a bad thing to have in a human habitation. It is consuming air, and that is what we primarily exist upon. As the saying is, "it makes the air bad." Those who breathe it say it makes them sleepy. Take the ordinary country church or public hall, where gas jets flare away and people are gathered together pretty thick. Everybody begins to nod in no time, and we laugh about it and lay it to the speaker and his prosy style. It isn't his fault at all. Those sleepers are really dying. The process will doubtless be interrupted, but, if it shouldn't be, the entire congregation would cease to exist. It's simply the same thing as when the rustic blows out the gas in his hotel bedroom, only it is slower. If we will burn gas we must be careful and hedge in the danger with every precaution we can.

But there are some phases it is almost impossible to guard against. With the high pressure the gas companies put on it is almost inevitable that there must be considerable escaping gas. This gas, as made in Denver, contains carbon monoxide, and that is a deadly poison. Indeed, there are many physicians that state that to this much of the city's diphtheria can be traced. The best way is to do as I do and use the incandescent electric light. It takes absolutely nothing from the air.

Dr. Robert Levy, Professor Gross Medical College.

For every person there ought to be 800 cubic feet of space. The ordinary parlor, twenty feet square and nine feet high, is accordingly about right for five people. Turn on a couple of gas jets and you have two guests at once, and your room ought not to have more than two people besides yourself in it. How many restrict their little parties to that kind of a tete-a-tete? Of course it is almost impossible to figure exactly, but it is safe to say that the ordinary gas jet uses approximately the same amount of air as a man. Between furnaces and gas jets we have to face an array of dangers nightly that would appall us if we only knew them.

OPINION OF A HOUSEWIFE.

In the decoration of our homes it is of great importance to consider the kind of light we are to use. Gas, at its best, is a soot producer, and where it is the means of illumination, the paper and house furnishings should be selected accordingly. Gas will practically ruin light paper, carpets or upholsterings in a short time, and those who are compelled to use it will find that sombre and dark fittings will not show the dirt which under these conditions is invariably present.

My lace curtains are white now in strong contrast to the dingy gray verging on black that they were when I used gas. To keep them even respectable, I had to have them laundried so often that they were very short lived indeed. Unfortunately, however, I cannot have my fine collection of paintings laundried. They look like antiques and have lost their life and freshness. I would gladly pay my gas bills over again if I could undo the results of the soot and gas which came from that light.

The following is the opinion of a well-known druggist in Boston, Mass.

Gentlemen:—Replying to your inquiry relative to my experience of the Welsbach lights I have nothing to say in their favor, and regret very much ever having adopted them as they have been a perpetual expense to maintain even in half presentable order, and I have failed to observe any appreciable saving in my bills, the consumption of gas having been equally large as when passed through the ordinary lava tip.

My opinion is that they are not practical for stores where cold air is of necessity admitted for purposes of ventilation, as the slightest draft of chilled air striking the already over-heated chimney cracks it at once, and at the same time invariably breaks the mantle so as to necessitate a new mantle and glass, which means 50 cents each time.

I have also found that the heat given off from these burners is intense, far more than gas passing through the ordinary burner. I have abandoned them entirely.